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FEDERAL-GRANT RESEARCH
at the
STATE AGRICULTURAL
EXPERIMENT STATIONS

Projects on
POTATOES
Part 22, Section b

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Compiled April 1958 by

The State Experiment Stations Division, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C., for use of workers in agricultural research in the subject-matter areas presented. For information on specific research projects write to the Director of the Station where the research is being conducted.

Issued July 1958

FEDERAL-GRANT RESEARCH

at the

STATE AGRICULTURAL EXPERIMENT STATIONS

Projects on

VEGETABLES

Section b: Potatoes

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INTRODUCTION

This compilation is one of a series providing information on State agricultural experiment station research supported by Federal-grant funds appropriated annually by Congress under authorization of the Hatch Act of 1887, as amended and approved August 11, 1955, and Section 204 (b) of the Agricultural Marketing Act of 1946. It is prepared for use by research workers in the subject-matter areas presented. Only that part of each State's research program supported by Federal-grant moneys is included.

In addition to the Federal-grant moneys, the State experiment stations receive some Federal support through cooperative agreements or contracts with the U. S. Department of Agriculture. Information on such research, along with other departmental research, is available in the Central Project Office, Agricultural Research Service.

A substantial part of each State agricultural experiment station's research is supported with moneys appropriated by the respective State or Territorial Legislatures and through other forms of private and public financing. Information on current agricultural research at the stations which is not financed under the Federal-grant program or through USDA cooperation can be obtained from experiment station directors.

The information given in the series of Federal-grant compilations includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project if it is a contributing project.

Relevant regional projects, if any, appear at the end of the compilation. States having projects contributing to regional projects are indicated. The Roman numeral (and capital letter) refer to the location in the summary of the contributing project title and objectives. The States are grouped into four major regions. These are designated NC-North Central, NE-Northeastern, S-Southern, and W-Western. The capital letter "M" following the letters for the region indicates regional marketing projects.

POTATOES

Breeding

Alaska

Potato Breeding and Propagation. To (1) develop at Matanuska a productive, high quality potato for the early market, and a productive, high quality potato with desirable horticultural characteristics that will keep well in storage; and (2) evaluate all commercial varieties and new introductions in the States and foreign introductions to the States for their desirability toward attaining the above, and to maintain disease-free germplasm of all lines that appear to be valuable for the breeding program in Alaska.
Hort. 4 Coop. ARS

Iowa

Potato Breeding. To (1) develop a potato variety with good cooking and market quality, disease resistant, and adapted to muck soils, (2) produce combinations of desirable characters in strains of potatoes for use as parents in breeding program, (3) study techniques and methods, and develop procedures for screening and selecting superior lines in segregating progenies, (4) maintain promising selections and parent cultures and increase these for distribution in an exchange with other stations cooperating in the National Breeding Program, and (5) emphasize breeding for disease resistance to scab, late blight, and certain virus diseases.
Hort., Pl. Path. 1184

La.

Development of High Yielding Disease Resistant Potatoes for Louisiana Conditions. To breed varieties resistant to early and late blight, rugose, and mild mosaic, to increase yields and better quality of tubers, and help certified seed industry, particularly in regard to export of Louisiana seed potatoes.
Hort. 395 Coop. USDA

Maine

Breeding, Selecting, and Testing for Potato Disease Control. To (1) develop potato varieties with resistance or immunity to X-virus, leaf-roll, ring rot, late blight, and scab; (2) develop potato seed stocks that are free of X-virus, ring rot, etc.; and (3) test such resistant varieties and healthy seed stocks for yielding capacity, tuber type, and cooking quality.
Pl. Path., Ent. 27 Coop. ARS

Mich. The Planning and Coordination of Research Under Regional Project (NC-35) Potato Improvement Through Parental Line Breeding-Trust Fund for Travel of Technical Committee. To further the regional research of this project by serving as trustee for regional research funds allotted for planning and coordination.
Admin. 829 (NC-35)

Minn. Potato Breeding. To combine various desirable tuber and plant characteristics into varieties adapted for production in Minnesota, for handling and transportation from field to consumer, and acceptable to the consumer; and to develop more efficient breeding procedures and selection techniques for combining these characteristics.
Hort. 2101 Coop. USDA

Minn. Potato Improvement Through Parental Line Breeding. (1) Expand study of methods of using inbreeding and outbreeding. (2) Obtain information on efficiency of using various possible methods of combining and obtaining a high degree of homozygosity of desirable characters and utilization of clones in obtaining improved varieties.
Hort. 2128 (NC-35) Coop. ARS

Minn. Planning and Coordination of Research Under Regional Project (NC-35), Potato Improvement Through Parental Line Breeding. To further Regional Research in Potato Breeding in the North Central Regions.
Admin. 2811 (NC-35)

Nebr. The Development of New Varieties of Potatoes with Superior Disease Resistance, Yield and Quality. To develop new varieties which mature early and will be superior to present varieties in: 1. resistance to soil borne diseases; 2. resistance to tuber cracking at harvest time; 3. better culinary quality, especially to be superior in texture; 4. high ascorbic acid content; 5. attractive market appearance; 6. resistance to flea beetle, leaf hoppers or psyllids; 7. greater degree of heat and drought endurance; 8. ability of tubers to heal wounds rapidly; and 9. resistance to any other potato diseases.
Hort. 229

Nebr.

Breeding Potato Parental Lines for Resistance to Scab, Heat, and/or Drouth. (1) Develop parental lines with a high degree of homozygosity for resistance to types of common scab occurring in state combined with red skin of tubers, pollen fertility, and heat and drouth endurance. (2) Incorporate in breeding lines desirable characters obtained from lines developed by breeders of other states; (3) superior genes from other species into lines developed in 1 and 2. (4) Learn physiological or morphological bases for heat and/or drought endurance and differences in metabolic efficiency of different clonal lines of potatoes. (5) Establish techniques for increasing efficiency of breeding programs by utilizing parents of greater homozygosity with proven combining ability.
Hort. 540 (NC-35)

N. Y.
(Cornell)

Permanent Improvement of the Potato by Plant Breeding Methods. To produce by plant breeding methods varieties resistant to black-spot, leaf roll, scab, blight, etc., which are horticulturally acceptable and adapted to Long Island conditions.
Pl. Path. 130 Coop. USDA

N. Y.
(Cornell)

A Study of Quantitative Inheritance in the Potato. Evaluate biometrical procedures and theory concerning quantitative inheritance in polyploids.
Pl. Breeding 196

N. C.

Irish Potato Breeding. To (1) develop varieties which are early maturing, productive, resistant to major diseases and insects, and superior in carrying and in market qualities; (2) establish and maintain special breeding lines carrying genetic characters that are important in southern region; and (3) study inheritance of a. resistance to scab, and to southern bacterial wilt, b. tuber color, and c. time of maturity.
Hort. 81 Coop. ARS

N. Dak.

Potato Breeding in North Dakota. (1) Develop productive varieties resistant to bruising and certain diseases, and superior in table, market, and processing quality. (2) Test adaptability and value of varieties and selections. (3) Learn breeding value of parental stocks and varieties. (4) Maintain disease free stocks of breeding lines and selections.
Hort., Agr. Engin., Pl. Path. 12-1 Coop. USDA

Ohio

Evaluating Insect Resistance in Varieties and Strains of Potato. To (1) study behavior of potato pests (with major emphasis on potato leaf-hopper and potato flea beetle, and secondary consideration on potato aphids, Colorado potato beetle, blister beetles, and tarnished potato bugs), with special reference to strains; and (2) develop a variety or varieties of potato which combine insect resistance with desirable horticultural qualities.
Ent. 23 Coop. ARS

Pa.

Breeding Disease-Resistant Varieties of Potatoes. To breed new varieties of potatoes resistant to disease, superior in appearance and quality, and adapted to Pennsylvania environmental conditions and market.
Bot. 755 Coop. ARS

Pa.

Cytogenetic Studies in the Genus Solanum. (1) Evaluate natural relationships among species of genus by means of morphological, genetic, and cytological studies. (2) Learn types of isolating mechanisms that keep species of genus separated.
Bot., Pl. Path. 1215-B

S. C.

The Breeding and Improvement of Sweet Potatoes. To study (1) strains which are productive and free from disease and which produce roots of desirable shape and quality; (2) possibilities of creating homozygous strains constant for yield, root shape, and other factors; (3) development of new varieties and strains which combine earliness, disease resistance, productivity, and high quality.
Hort. 121 Coop. ARS

Wash.

The Breeding and Development of Potato Varieties. To develop and test new and old varieties of potatoes and determine their comparative values as related to commercial adaptability, and to cooperate with Plant Pathology Department in determining their resistance to leaf roll.
Hort., Pl. Path. 1122 Coop. ARS

Wis.

The Improvement of Quality and Disease Resistance of the Potato and Methods of Accomplishing This by Breeding. Develop high quality and disease-resistant potatoes that will sell more successfully on early and late markets.
Genet., Pl. Path. 566 Coop. USDA

Wyo.

Breeding and Selection Studies with Potatoes. To (1) test varieties and promising seedling for adaptation to Wyoming; (2) develop new superior varieties; (3) test new varieties and promising seedlings for ring rot and scab resistance and for keeping and cooking quality; and (4) maintain foundation seed of adapted varieties.
Agron. 488

Varieties

Maine

Adaptation of New Potato Varieties to Maine Conditions and Marketing Needs. To evaluate new potato varieties as to their adaptation to Maine growing conditions and their potential place in Maine potato industry.

Agron. 19 Coop. ARS

N. Y.
(Cornell)

A Taxonomic Study of the Members of the Solanaceae, Scrophulariaceae, Verbenaceae, Boraginaceae, Nolanaceae. To determine general species, and named varieties of above families that are currently cultivated in U. S.; (2) determine correct identity and nomenclature of domestically cultivated components; (3) devise techniques and devices by which horticulturists may identify cultivated members of the families; and (4) provide growers and distributors with information from this study as pertains to misidentifications and correct identifications of materials known to be grown or distributed under erroneous names.

Hortorium 69

W. Va.

Improvement of Potato Varieties for West Virginia. (1) To select promising breeding stocks of improved physiological characteristics having greater resistance to disease, insect injury, and unfavorable environmental factors commonly found in West Virginia; and (2) to determine the nature, variability, and methods of inheritance of resistance in potato varieties to diseases and to injuries by insects and environmental factors.

Hort., Pl. Path. 4

Wis.

Introduction, Preservation, Classification, Distribution, and Preliminary Evaluation of Wild And Cultivated Species of Solanum. To provide potato breeders and other investigators with germ plasm which will assist in development of varieties which will be productive, resistant to disease and insects, and superior in nutritive, culinary, market and industrial quality.

Genet. 800 (IR-1) Coop. ARS

Culture

Alaska

The Influence of Environmental Factors on the Growth and Development of Potatoes. To study environmental factors with special emphasis on light and temperature.
Hort. 5 Coop. USDA

Alaska

Potato Variety Testing, Seed Piece Spacing - Fertilizer Response and Storage. To determine (1) which potato varieties and seedlings screened from the breeding project are best adapted for early harvest from the standpoint of yield, table quality, and appearance of tubers; (2) which varieties and seedlings are best adapted for late harvest from standpoint of yield, table quality, appearance, and quality after varying periods of storage up to 10 months; and (3) proper spacing between seed pieces and fertilizer practices for both early and late harvest varieties.
Hort. 6

Alaska

Technological Improvements to Increase the Quality and Consumption of Alaskan Potatoes. Learn (1) why Alaska consumers prefer stateside grown potatoes when attractive packs of Alaska grown potatoes are for sale at same counters; and evaluate economic implications of commercial adaptation of technological changes by growers and handlers; (2) by chemical analysis and organoleptic tests if Alaskan potatoes differ from stateside potatoes offered in Alaska; (3) if Alaskan potatoes are as acceptable to Alaskans as stateside ones when they are grown under varied soil and fertilizer conditions, stored and handled in a manner comparable to stateside ones.
Hort., Econ. (ES-476)

Calif.

Cultural Practices for Potatoes as Influencing Yield and Quality. (1) Develop methods of growing, handling and planting seed potatoes to improve stands, yield and quality. (2) Adapt newer fertilizers to bed-planted furrow-irrigated plants. (3) Determine causes and means of preventing physiological disorders. (4) Integrate studies with breeding and post-harvest handling research.
Veg. Crops 1665

Colo.

The Effect of Various Fertilizers, Minor Elements and Soil Amendments on the Yield, Grade, Color, Cooking Quality and Keeping Quality of Potatoes. (1) To determine the soil factors influencing skin color, tuber type, yield, size, and quality of red potatoes in San Luis Valley; (2) to study the effect of soil applications of different types; and (3) to develop a control method.
Hort. 45

Colo.

Potato Tuberization and Root Growth Factors. (1) Characterize properties of tuber-inducing stimulus. (2) Study environmental factors affecting formation of stimulus and its expression through tuber enlargement. (3) Characterize and identify root growth promoting substances in tubers.
Hort. 48

Fertilization of Potatoes. To determine effects of all major and minor plant nutrients at several rates on yield and quality of potatoes grown (1) under continuous culture, and (2) in rotation with various crops.
Pl. Sci. 158

Idaho

Consumer Preference for Branded Idaho Potatoes. Learn: (1) consumer preference for: stamped vs. non-stamped potatoes, Idaho Russets vs Russets from other states; (2) legibility and appearance of stamping tubers with "Grown in Idaho"; (3) competitive position of Idaho Russet Burbank potatoes with Russets from other states as measured by: amount and seriousness of defects, tuber size range and uniformity, selling price and volume of Idaho Russet Burbank potatoes as compared to Russets from other states; (4) consumer preferences with reference to: tuber size, grade and quality as related to price and use, source, seasonality of purchases, size of purchases, size of purchase per store visit.
Hort., Agr. Econ. 342

Idaho

A Comparison of Sprinkler and Surface Irrigation Methods on Yield, Quality, Disease and Storage of Potatoes. (1) Compare daily irrigation with normal interval irrigation by surface and sprinkler methods for relative effects of each on yield, quality, disease, and storage. (2) Learn effects of daily irrigation on prevalent diseases; study micro-climate and evaporation in area of plant with respect to conditions favorable for increase of diseases.
Agr. Engin., Pl. Path., Hort. 346

La.

The Effects of Different Lengths of Dormant Period and Certain Chemicals Upon the Emergence, Productivity and Storing Ability of Several Varieties of Potatoes. To (1) try to learn reason for different varieties having different rest period needs and productivity of each variety; and (2) ascertain effect of certain growth regulators, applied as both preharvest and post-harvest treatments on storage ability and quality of standard varieties of potatoes.
Hort. 393

Maine

Fertilization of Potatoes. To (1) evaluate practices of heavy fertilization as to kind and amount of fertilizer used for most economical yields of good quality potatoes; (2) test new fertilizer materials showing indications of being of value in production of potatoes; (3) perform current survey tests in order to test any nutrient element deficiencies; and (4) evaluate residual effect of fertilizer applications.

Agron. 10

Maine

Use of Lime on Agronomic Crops Grown in Maine. To (1) determine response to lime by various crops; (2) evaluate, chemically, availability of plant nutrients at varying pH levels; (3) test efficiency of various liming materials as to ability to change pH of a soil; and (4) compare various methods and times of application.

Agron. 43

Maine

Physiological Investigations of the Potato Plant. (1) Study effects of growth substances; macro and micro nutrients, and other chemicals on tuberization, differential nutrition, and other undefined interactions. (2) Characterize various cation-anion relations as to effects on mode of entrance, use, metabolic aspects, and interactions thereof. (3) Evaluate effects of restricted O on P and K mitigation and tuberization-initiation and differentiation. (4) Study soils in regard to exchange complexes and their association with nutritional aspects. (5) Increase crop production by application of fundamental results from above investigations.

Agron. 47 Coop. USDA-National Science Foundation

Maine

Precutting Seed Potatoes for Shipment to Farmers in the Northeastern States. To determine if it is practical to precut and treat seed potatoes in Maine for shipment to trade in other areas; (1) select treating materials to produce best curing and suberization of precut seed potatoes. (2) learn best storage conditions for handling precut seed potatoes.

Agr. Engin., Pl. Path., Agron. 53

Mo. *Commercial Culture of Truck Crops and Greenhouse Vegetables.--g. Cultural Practices to Improve Irish Potato Yields and Storage Keeping Quality*. To (1) make field tests of adaptability of newly introduced varieties to soil and climate of the commercial potato section of Missouri; (2) compare market and storage qualities of these varieties with predominant varieties to find early varieties of both red and white types with more uniformity, better appearance and shipping, handling and storage qualities; (3) attempt a correlation of yield and internal breakdown with fertilization practices and level of exchangeable soil potash; and (4) evaluate seed treatment with pentachloronitrobenzene as practical control of Actinomyces scabies.
Hort. 121-g

Mont. *A Study of Factors Influencing Seed Potato Values and Methods of Evaluating Same*. Potato seed stocks will be grown under varying conditions of soils, fertilizers, and cultural practices and will be harvested in different degrees of maturity. Stock will be evaluated under the ultra-violet lamp, chemically, physically and as to specific gravity, and replanted the following year for field performance. Crops will be evaluated in a manner similar to the tests used on the seeds.
Hort. 821

Mont. *Potato Yields and Quality as Influenced by System of Planting*. To establish relationships between planting systems and other related cultural practices in order to determine most desirable combination for commercial potato production in Montana.
Hort. 890

N. Y.
(Cornell) *Fertilizer and Soil Management Studies with Potatoes in Upstate New York Areas*. (1) Learn most efficient rate of N, P, and potash on muck and mineral soils and correlate results with soil tests. (2) Learn cultural practices that may be effective in alleviating an Fe, Al, and Mn toxicity. (3) Learn if Long Island plow plant method is adaptable to heavier stony soils of upstate. Note effect on yield and soil structure. (4) Learn effect of above factors on total yield, marketable yield and weed control for several commercially important varieties differing in respect to depth of tuber set.
Veg. Crops. 169

N. Y.
(Cornell)

A Study of Production Factors Affecting Processing Quality and Culinary Quality of Potatoes. Develop improved methods of producing potatoes which will result in potatoes of better processing and table quality.
Veg. Crops 216

N. Y.
(Cornell)

Control of Weeds and Vine Growth of Potatoes with Chemicals. Control weeds in potatoes more adequately with chemicals and find better methods of killing or slowly maturing potato vines before harvest.
Veg. Crops 217

N. Dak.

Effect of Production Practices on the Quality of Potatoes. Learn market and table quality factors as affected by: control of russet scab; skin color of red varieties; control of tuber size and second growth symptoms; tuber maturity and susceptibility to mechanical bruises at harvest as affected by skin and physiological characteristics; effects of soil type, area of production and supplemental irrigation; chemical and physical characteristics of flesh; sprain and phloem necrosis.
Hort. 12-8 Coop. AMS

Ohio

Interrelation of Frequency of Irrigation and Rate of Application of Nitrogen Fertilizer on the Yield and Quality of Potatoes Grown on Sandy Loam. To determine (1) at what soil moisture level irrigation should be applied to obtain maximum yield of Irish Cobbler potatoes, how rapidly moisture is extracted, how frequently and in what volume water needs to be applied; (2) how much N is needed in fertilizer for irrigated and unirrigated potatoes; (3) effect of irrigation and N supply on specific gravity and quality of potatoes for potato chips; and (4) compare varieties grown on productive soil under large scale methods of culture and irrigation.
Hort. 100 Coop. ARS

R. I.

Organic Matter and Soil Structure as Factors in the Renovation of Soils After Continuous Cropping with Potatoes. (1) Evaluate short rotations with redtop for the restoration of desirable structure in soils cropped with potatoes. (2) Determine fractions of organic matter involved in creation of desirable soil structure and increased yields of potatoes. (3) Study correlation between soil structure and potato yields.
Agr. Chem., Agron. 1 (NE-11)

R. I. Potato Culture.--a. Potato Breeding and Testing. b. Pre-Harvest Weed Control in Potatoes. c. Sod Crops for Use in Crop Rotations with Potatoes. To (1) test new potato varieties and seedlings as they are developed in natural breeding program, in order to determine value for local conditions; (2) determine relative value of different chemical preparations for use as a spray on weedy potato fields, just previous to harvest, in order to kill weeds and potato vines; and (3) test comparative value of timothy, red top, timothy and red top, timothy and alsike, timothy and red clover, and red top and alsike as sod crops to be grown in a 4-year rotation of two years of potatoes and two years of sod crops.
Agron, Pl. Path. 201

R. I. A Study of the Economical Fertilization of Potatoes. Learn (1) fertilizer ratios best suited to production of optimal yields, under Rhode Island conditions; (2) economical amounts of commercial fertilizers required to maintain yields under continuous potato culture. (3) Study need of organic matter in soils continuously used for potato growing. (4) Compare continuous potato culture with potatoes grown in rotation with red top.
Agron., Agr. Chem. 206

R. I. The Effect of Certain Crops on Succeeding Crops of Potatoes. To determine what factors are responsible for the beneficial or deleterious effects of red clover, timothy and red top on a succeeding crop of potatoes.
Agron., Agr. Chem. 207

R. I. The Effect of Supplemental Irrigation on the Yield and Quality of Irish Potatoes and Forage Crops. To learn (1) leval of soil mositure when supplemental irrigation should begin for maximum yields; (2) amount of irrigation water needed to bring soils from initial moisture levels to field capacity; (3) how often to irrigate to keep moisture within selected moisture range; (4) adjustment of fertilizer practice needed when using supplemental irrigation; (5) adjustment of fungicide and insecticide use necessary with supplemental irrigation. (6) Study local rainfall data with reference to needs for irrigation. (7) Compare devices for measuring soil mositure with dry weight laboratory method.
Agron., Pl. Path., Ent. 208 (NE-22)

Harvesting and Storage

Alaska

Tuber Injury and Pathogenic Decomposition of Potatoes Marketed in Alaska. Devise processing and handling methods adapted to Alaska's potato marketing industry so as to reduce mechanical damage and decrease storage and marketing losses.

Agr. Engin., Pl. Path., Ent. 33

Idaho

Reducing Mechanical Damage and Subsequent Deterioration of Potatoes. To learn (1) manner and extent to which each step in harvesting, storing, grading, washing, handling, packaging, loading, and retailing potatoes contributes to mechanical damage; (2) manner and extent to which each step in bulk handling, into and out of storage, contributes to mechanical damage of potatoes; (3) effect of different storage conditions on further deterioration of mechanically injured potatoes; and (4) effectiveness of various types of automatic temperature control units for potato storages.

Hort. 255

Idaho

Effect of Irradiating Russet Burbank Potatoes with Radio-Active Fission Products Upon Their Storage and Market Qualities, Disease Prevention and Killing of Nematodes Contained Within the Tubers. To learn (1) dosage of irradiation from fission products that will inhibit sprouting of Russet Burbank tubers, (2) effect of said treatment on taste, cooking and processing qualities, flesh color and greening of skin under normal retail conditions, (3) loss during storage due to rots, shrinkage, and sprouting compared to non-treated tubers, (4) temperature that will allow least moisture sprout, and rot loss to treated tubers, (5) how long marketing can be extended by use of treatment and still receive consumer acceptance, (6) best time for using treatment to expect best results, (7) possible effect of irradiation of tubers in delaying expression of Verticillium wilt through modification of dormancy, (8) if said dormancy can be broken by use of ethylene or other chemicals, and (9) if *Ditylenchus destructor* can be killed by irradiation without injuring table quality.

Hort. 268 Coop. AEC

Idaho

Reducing Storage Losses and Mechanical Injury to Potatoes. Determine (1) weekly the volume of air (cu. ft., per minute, per ton, of tubers) needed to maintain a temperature of 38°F. in storage bins when air supply is (a) constant at 38°F., or (b) obtained from outside and ranging from 32°F. to 40°F., (2) storage losses and hours of fan operation to keep potatoes at 38°F. with different volumes of air (10 cu. ft., per minute, per ton, as compared to 100 cu. ft.), (3) Optimum value and ventillating time daily to keep constant temperature of 38°F. in bins, and keep storage losses to a minimum, (4) effect of periods of post harvest storage at 38°F., 50oF., and 70°F., with later storage at 70°F. upon: time and extent of sprouting, starch content, moisture and rot losses. (5) effect on sprouting, storage losses, and starch content of different concentrations of various volatile sprout inhibitors applied through ventilating system at several dates in storage season, (6) volume of air necessary with various gas concentrations for adequate distribution of gas through bin. (7) Test application efficiency of applying various inhibitors through ventilating system.

Hort., Agr. Engin. 352

Maine

Study and Development of Improved Methods and Equipment for Harvesting and Moving Potatoes to Storage. To improve potato quality and handling efficiency through design and development of methods and equipment for harvesting and moving potatoes to storage.

Agr. Engin., Agron. 54 Coop. AMS

Maine

Study and Development of More Efficient Methods and Equipment for Handling Potatoes Through Storage and Packing Houses. To improve potato quality and handling efficiency through design and development of methods and equipment for handling, storing, and processing potatoes through storage and packing houses.

Agr. Engin. 72 Coop. AMS

Minn.

Studies on Harvesting, Handling, Storage and Marketing of Table Stock Potatoes.--1. Studies on the Relation of Harvesting and Handling Operations and Storage Conditions to the Market and Culinary Quality of Potatoes. To improve the market and culinary quality of potatoes grown in the Red River Valley.

Hort., Agr. Engin., Pl. Path. 2118-1 Coop. ARS

Minn.

Studies on Harvesting, Handling, Storage and Marketing of Table Stock Potatoes.--2. Studies on the Improvement of Potato Harvesting, Handling and Storage Equipment. To improve the market and culinary quality of potatoes grown in the Red River Valley.

Hort., Agr. Engin. 2118-2 Coop. ARS

Nebr.

Potato Storage in Nebraska. To determine how to construct and operate potato storages in various parts of Nebraska to preserve different varieties of potatoes for specific uses in best condition or for maximum periods of time in the most economical manner. More specifically, to (1) evaluate storage characteristics of various units of the new storage at Scotts Bluff Experiment Station when operated according to the best known procedures as determined by effect on the potatoes--or to acquire an inventory of physical condition brought about within the various units of storage, and in the adjacent ground, and their influence on the tubers, so as to provide comprehensive information on type of conditions the storage can provide for later experiments; (2) determine how more effective potato storage can be provided for economically by modifying design or operational practices of storages; (3) determine effect of various preharvest, harvest time and storage conditions upon physiology of tubers of different varieties being stored for specific purposes; and (4) ascertain physical conditions provided by various types of storages located in various parts of the state where climatic and ground conditions differ.

Hort. 439

N. Y.
(Cornell)

A Study of Methods and Equipment for the Storage and Handling of White Potatoes with Particular Emphasis on Preserving Quality. To study (1) influence of controlled ventilation on early harvested vs. late harvested potatoes; (2) influence of controlled ventilation on incidence of storage diseases; (3) influence of controlled ventilation on sprouting, shrinkage with and without sprout inhibitors; (4) performance of controlled ventilation systems such as air movement rates, static pressures, controls, power costs, etc.; and (5) develop efficient methods and equipment for handling potatoes into and out of storage.

Veg. Crops, Pl. Path., Agr. Engin. 36 Coop. AMS

N. Dak.

The Development and Testing of Equipment to Measure the Resistance of Potatoes to Bruising and Injury. To develop and test equipment to measure resistance of potatoes to bruises from impact, pressure and abrasion.

Agr. Engin., Hort. 4-1

Ohio

Use of Maleic Hydrazide in the Inhibition of Sprouting in Potatoes and Onions During Storage. Study effect of various concentrations and dates of application of maleic hydrazide to potatoes and onions on inhibition of sprouting of crops in storage.

Hort. 156

R. I.

Improvement in On-Farm Washing, Sanitation, and Pre-Packaging of Potatoes. (1) Study and Adapt new developments in packaging materials and processing for direct grower sale. (2) Improve and maintain their appearance and keeping quality as packaged until used.

Agr. Econ., Pl. Path., Ent., Agron. 108 (NEM-20) Coop. AMS

Processing and Utilization

Alaska

Chipping and French Frying Quality of Alaskan Grown Potatoes. To determine (1) if potato seedlings arising from Alaska's hybridizing program have the needed quality of chipping and frying and (2) which of the adapted commercial varieties are best suited for chipping and frying.

Hort., Home Econ. 17

Idaho

Specific Gravity, Mineral Composition, and Sloughing of Potato Tubers. To learn (1) if specific gravity and starch content of potato tubers are correlated with ash content; (2) if sloughing of cooked tuber tissue is correlated with total ash content of fresh and cooked tubers; (3) if amount of individual mineral elements, particularly Ca and Mg, is correlated with specific gravity, starch content or sloughing losses; (4) distribution of total ash and individual elements within various portions of tuber.

Agr. Chem., Agron. 210

Mo.

Technology of Irish Potato Products. To (1) determine relative storing qualities of Irish potato varieties and effect of several treatments on these varieties; and (2) study factors affecting texture and color of mashed potatoes during preparation, freezing, and frozen storage.

Hort. 234

N. J.

Chemical Factors Influencing the Cooking and Freezing Quality of Potatoes. Learn (1) ways of increasing solids content of potatoes; (2) if total solids alone influence quality or if an imbalance of chemical components causes poor quality.
Food. Technol. 276

N. J.

Fertilizing, Varietal and Cultural Factors Influencing the Cooking, Chipping, and Freezing Quality of Potatoes. Learn effect of following factors on potato chips, French Fries, and table quality: sulfate of potash vs. muriate of potash; various fertilizer formula and rates; varieties; cultural factors as: planting depth, planting and harvesting dates, use of irrigation, applications of fungicides and insecticides, methods and time of vine killing, sprout inhibitors, storage conditions.
Pl. Path. 483

N. Y.
(Cornell)

The Oxidizing Enzyme Systems in the White Potato. To (1) study relationships between oxidative enzymes of potatoes and potato discolorations; (2) study location of such enzymes, their substrates, and inhibition; and (3) determine interrelationships of maturity of potatoes, degree of discoloration, and oxidative enzyme systems.
Veg. Crops., Food and Nutr. 110

N. Y.
(Cornell)

Research to Improve the Technology of Handling Potatoes After Harvest and the Evaluation of New Practices by Consumer Panels and Objective Measurements. Develop new ways of handling and processing potatoes and new methods of quality control.
Veg. Crops 197 (NEM-20)

Ohio

Effects of Varieties, Cultural Practices, Storage, Pest Control and Processing Techniques on the Chipping Quality of Potatoes.--1. Influence of Variety, Fertilizers, and Date of Planting on Quality of Potatoes Manufactured into Potato Chips. To determine (1) changes in cultural practices needed to take full advantage of longer growing period and larger yields resulting from use of new varieties, improved pesticides and fertilizers with higher proportion of N; and (2) effect of cultural practices on quality of the crop, particularly on value of potato chips.
Hort. 122-1

Ohio

Relation of Processing Technique and Chemical Composition to the Quality of Potato Chips. To learn (1) to what degree chemical differences in potatoes are correlated with quality of chips; (2) if differences in quality found in potatoes shortly after harvest are present a month after cool storage and after a following month of warm storage.
Hort. 122-3

Wis.

The Vitamin Content and Cooking Quality of Potatoes. A. Culinary Qualities of Wisconsin Potatoes. To study (1) distribution of the vitamin in different parts of the tuber; (2) differences due to variety; (3) effect of storage conditions and of various processes of food preparation on concentration of the vitamins in potatoes; (4) influence of various factors on their cooking quality.
Home Econ., Genet. 671

Disease Control

Alaska

Control of Potato Scab in Alaska. To devise control methods for potato scab that will be effective under Alaskan conditions.
Pl. Path. 49

Alaska

Factors Affecting the Development of Potato Ring Rot Under Alaskan Conditions. To (1) study factors affecting the development of ring rot in order to determine more efficient methods of detection of the disease; and (2) develop more effective control measures.
Pl. Path. 48

Conn.

Athogenesis by Soil Borne Organisms. To (1) learn pathogenicity and distribution of strains of Verticillium attacking potatoes, (2) make comparative study of enzymes and other toxic metabolites produced by soft rotting and vascular wilt organisms. (3) Relate these products to damage caused to host plants and to resistance to attack of related varieties. (4) Use data in developing control measures against soft rotting and vascular wilt diseases.
Pl. Path., Bot. 639

Ind.

Control of Scab, Late Blight, and Virus Diseases of Potatoes. Learn value of combined resistance to potato scab, late blight, and virus X. Reduce costs and increase efficiency of fungicidal control of potato foliage diseases through use of late blight resistance. Learn feasibility of Producing virus-free seed potato stocks.
Pl. Path., Agron. 840

Maine

Fungus Wilts of Potato Plants in Maine. To (1) determine relative importance of Verticillium albo-atrum, Fusarium spp., Collectotrichum atramentarium, and other fungi as causes of potato wilt; and (2) study Verticillium wilt with respect to effect on yield rate and tuber quality; varietal resistance; effect of soil type, soil treatments, fertilizer, and season on percentage of incidence, symptoms, and yield reduction; disinfection of implements and containers; development of inspector's field test for presence of fungus; other hosts, weed and crop; crop rotation; and relation to pink-eye and red xylem diseases.
Pl. Path. 6 Coop. ARS

Maine

Control of Potato Diseases by Chemicals. To discover and develop improved methods of control of potato diseases with chemicals.
Pl. Path. 22 Coop. ARS

Mich.

Disease Resistance in Potatoes. To (1) cooperate closely with potato breeding project in incorporating disease resistance in new potato varieties, (2) advance our fundamental knowledge of nature of disease resistance, factors influencing infection, symptom expression, and transmission, (3) develop means of eliminating at early stage susceptible potatoes from a population segregating for disease resistance, (4) use accepted procedures in identifying resistant seedlings in a progeny segregating for disease resistance, (5) evaluate clonal lines for resistance to disease, and (6) maintain good quality seed of advanced selections and parental stocks by greenhouse indexing and carefully maintained field seed plots.
Bot., Food Crops 85

Minn.

Cause and Control of Biological and Chemical Deterioration of Agricultural Products in Storage.--II. Potatoes and Other Vegetables. To determine (1) effect of chemical vine killers, wet soil, mud in storages and washing on the decay of potatoes in storage and transit, and to devise control methods; and (2) causes of decay on rutabagas in storage.
Pl. Path. and Bot. FH-2220-2

N. Y.
(Cornell)

Virus Diseases of Potatoes.--13. Biochemical Investigation of Potato Viruses. To determine (1) the fundamental properties of each potato virus; and (2) mechanism by which viruses are able to multiply and cause disease.
Pl. Path., Engin., Physiol. 127-13

N. Y. (Cornell)	A Study of the Factors Affecting the Efficiency of Potato Spraying and Dusting. To find better materials and methods of spraying potatoes. Pl. Path. 128
N. Y. (Cornell)	Studies to Determine Causes and Control Measures for Sub-Surface Black Spot of Potatoes. To determine causes of black spot and devise measures for its elimination or prevention. Veg. Crops 164
N. Dak.	The Nature of Virus Y Resistance in the Potato Selection ND457-1 and Some of Its Progenies. Learn what characteristics are responsible for virus Y resistance. Pl. Path., Hort., Ent., Chem. 12-6R (NC-35) Coop. USDA
S. Dak.	Potato Diseases and Their Control. To (1) develop a practical method of producing disease-free foundation stocks in South Dakota; (2) devise an effective, practical method of exterminating the potato ring rot organism from storage and transportation facilities, machinery, and tools; (3) test effectiveness of fungicides as seed treatments and foliage protectants in potato disease control; and (4) locate sources of resistance against important potato diseases in South Dakota, particularly scab. Pl. Path. 107
Wash.	Resistance of Potato Varieties and Seedlings to the Virus Leafroll Disease. To (1) test potato varieties and unnamed potato seedlings for resistance to infection by leafroll virus under field conditions; (2) study nature of leafroll resistance in order to facilitate testing for resistance and breeding of resistant varieties; and (3) test potato varieties and seedlings for development of phloem necrosis in tubers following infection with leafroll virus. Pl. Path. 274
Wis.	Relationship of Plant Nutrition to Disease Incidence and Expression of Symptoms. To learn influence of various (1) plant nutrient ratios and levels on visual expression of certain potato virus and other diseases, (2) nutrient ratios and levels on plant susceptibility to diseases and their effect on yields, (3) nutrient ratios and levels on behavior of virus in plant, measured quantitatively, (4) potato virus diseases on nutrient uptake by plant. Pl. Path., Ent., Soils. 774

Insect Control

Colo.

Control of Insects Transmitting Potato Viruses in Colorado. Learn (1) what insecticides give best control of aphids and leafhoppers; (2) most effective and economical rates of application; (3) if systemic insecticides will give protection to the potatoes late in growing season when there is a build up of aphid and leafhopper population.
Ent. 36 Coop. USDA

Maine

Wireworm Control in Relation to Modern Agricultural Methods. To obtain information on control of wireworms in potato land consistent with modern mechanized agriculture, especial attention being given to soil insecticides and fumigants lending themselves to mechanical application.
Chem., Hort., Ent. 71

Minn.

Causes of Outbreaks of the Potato Leafhopper, Empoasca Fabae (Harris). Cooperate with North Central Region Project on "Migration of Potato Leafhopper and its Causes." Obtain records of first appearance in spring and abundance during growing season. Study relation of ecological factors to populations.
Ent., Zool., Hort. 1734 (NC-29) Coop. ARS

Nebr.

Control of Potato Insect Pests.--1. Potato Flea Beetles. To (1) develop more effective, practical and economical methods of preventing losses caused by potato insects in Nebraska; (2) make biological and ecological studies of flea beetles and other important potato insects; (3) investigate certain fundamental biological and physiological aspects of relationship of insects to potato plants with special reference to development of resistant varieties.
Ent. 223-1

N. Y.
(Cornell)

Studies on the Control of Insects Attacking Potatoes.--1. Control of Insects Attacking Potato Foliage. To study insect losses from potato foliage pests.
Pl. Path., Veg. Crops, Ent. 97-1

N. Y.
(Cornell)

Studies on The Control of Insects Attacking Potatoes.--II. Control of Insects Attacking Potato Tubers. To determine practical methods for preventing wireworm damage.
Ent. 97-2

N. Y.
(Cornell)

Studies on the Control of Insects Attacking Potatoes.--IV. Control of Insect Vectors of Potato Virus Diseases. To apply control measures for insect vectors of potato virus diseases and determine the value in terms of disease free tubers.

Pl. Path., Ent. 97-4

Economics and Marketing

Idaho

Cost and Price Efficiencies in Potato Marketing. To (1) find methods so Idaho packers can reduce packing costs by a. better adjustment of labor force and equipment to potato volume and quality, b. better building layout and equipment arrangement, c. help machinery companies develop machine to rotate potatoes on grading table, and d. find or assist in development of machine to enable packers to size long potatoes economically; and (2) develop pricing formula for packers' use in buying potatoes from growers.

Agr. Econ., Agr. Engin. 285 (WM-19) Coop. AMS

Idaho

Case Studies of the Impact of Technology in the Marketing of Dairy Products and Potatoes. Learn new technologies being introduced in marketing of said products, study cases of new technologies in detail so as to learn their adaptability to Idaho plants and to assess effects upon processing costs and industry organization, test adequacy of currently used methodologies in appraising effect of innovations and to develop more adequate ones.

Agr. Econ., Dairy Indus., Hort. 292 (WM-25)

Maine

Economics of Irrigation on Potato Farms in Maine. (1) To examine resource characteristics of farms using various irrigation systems. (2) To learn costs and returns in irrigating potatoes under various physical and economic conditions.

Agr. Econ., Farm Mgmt., Agron. 89 (NE-33) Coop. USDA

Maine

Developing More Efficient Work Methods, Devices and Equipment for Physical Handling, Cleaning, Washing, Waxing, Grading, Sizing, Packaging and Other Related Practices on Maine Potatoes in Commercial Packing and Storage Houses. To increase productivity of labor employed in Maine potato storage and packing houses and reduce losses from decay, bruises, and other injuries by: (1) measuring relative efficiency of various types and combinations of types of equipment, including innovations, for performing materials handling, cleaning, washing, waxing, sorting, sizing, packing and other related practices in commercial potato packing and storage houses under variable conditions; (2) developing and testing improved methods for using various types and combinations of types of equipment for these operations; (3) developing plans for and testing prototypes of new types of equipment: (4) determining amounts of equipment of various sizes needed by packing and storage houses of various sizes to efficiently perform workload; (5) determining amounts of space that can be used in bins and store room when different types of equipment are used; (6) determining types of equipment and design of storage houses to most economically provide proper storage conditions; and (7) translating data from studies of materials handling practices into improved commercial facility designs.

Agr. Econ., Engin. 701 (ES-299)

Nebr.

Marketing Practices Associated with the Grading and Pricing of Potatoes. To learn (1) grading and pricing practices that will accurately reflect terminal market demands back to grower and shipper, (2) effect of grades and other quality indicators on prices for different lots of potatoes sent from shipping points in various states but which compete in same terminal markets.

Agr. Econ., Hort. 501 (NCM-15)

N. Y.
(Cornell)

Experiments in Retail Stores and on Selected Farms to Determine Consumer Acceptance of Potatoes. Learn what degree sales of white potatoes may be stimulated and to what extent consumers are willing to pay for clean, sorted potatoes; in bulk or in transparent film bags or other containers.

Agr. Econ., Agron. 12-6 (NEM-20)

Pa.

Economic Effects of Various Potato Marketing Practices. (1) Learn effect of practices as washing, sizing, grading, and packing in different types of bags, on consumer and trade demand and on grower costs and returns.

Agr. Econ. and Rur. Sociol. 1259 (NEM-20)

REGIONAL PROJECTS

IR-1 Introduction, Preservation, Classification, Distribution, and Preliminary Evaluation of Wild and Cultivated Species of Solanum. To provide potato breeders and other investigators with germ plasm which will assist in the development of varieties which will be productive, resistant to disease and insects, and superior in nutritive, culinary, market and industrial quality.

Contributing Station: Wis. II

NC-35 Potato Improvement Through Parental Line Breeding. I. To accelerate and increase the effectiveness of the potato breeding programs of the North Central States. II. To develop parental lines of potatoes with high combining ability for resistance to common scab (Streptomyces scabies), late blight (Phytophthora infestans), virus X and virus Y and including one or more other essential characteristics such as high dry matter, desirable tuber type and high yielding ability. III. To secure information on the efficiency of various breeding procedures designed to obtain the degrees of homozygosity necessary for the development of parental lines possessing high combining ability. IV. To develop an organized program to incorporate genes from other Solanum species into parental lines whenever material of suitable cytogenetic character is made available by the IR-1 project.

Contributing Stations: Mich. I, Minn. (two projects) I, Nebr. I, and N. Dak. VI.

OTHER REGIONAL RESEARCH PROJECTS REFERRED TO IN THIS SUMMARY BUT SUMMARIZED ELSEWHERE

NC-29	Migration of the Potato Leafhopper and its Causes. (See Part 7, Section a)
NCM-15	Potato Grade-Price Relationships in the North Central Region. (See Part 14, Section b)
NE-11	Soil Structure Problems in Northeastern Agriculture. (See Part 21, Section c)
NE-22	Soil-Plant-Water Relationships as a Basis for Irrigation (See Part 3, Section a)
NE-33	Economics of Irrigation on Northeastern Farms. (See Part 3, Section a)
NEM-20	Effects of Changing Marketing Practices on Product Quality, Consumer Acceptance, and Returns in Marketing Potatoes. (See Part 14, Section b)
WM-19	Economic and Engineering Studies of Fruit and Vegetable Handling, Packing, and Packaging. (See Part 14, Section b)
WM-25	Case Studies of the Economic Effects of New Marketing Technologies. (See Part 14, Section g)

LIST OF COMPILATIONS OF FEDERAL-GRANT RESEARCH PROJECTS AT STATE AGRICULTURAL EXPERIMENT STATIONS

ARS-23-8: Part Numbers	Subject-Matter Area	Title of Section
1	Agricultural Chemistry	Agricultural Chemistry
2	Agricultural Economics	a. Prices, Incomes, & General Studies of Commodities & Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering	a. Land & Water Use & Development b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Husbandry	a. Beef Cattle b. Sheep & Goats c. Swine
5	Dairy Husbandry	Dairy Cattle
6	Dairy Technology	Dairy Technology
7	Entomology & Economic Zoology	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology	a. Food Chemistry, Microbiology, Sanitation & Public Health b. Food Engineering, Processing, Product and Process Development, Utilization and Waste Disposal c. Food Quality & Standards, Acceptance, Preference, & Marketing
10	Forage Crops, Pastures & Ranges	Forage Crops, Pastures & Ranges
11	Forestry	Forestry

ARS-23-8: Part Numbers	Subject-Matter Area	Title of Section
12	Fruits & Nuts	Fruits & Nuts
13	Home Economics	a. Human Nutrition
		b. Housing
		c. Clothing & Textiles
		d. Foods-Consumer Quality & Utilization
		e. Household Economics & Management
14	Economics of Marketing	a. Field Crops
		b. Fruits & Vegetables
		c. Livestock, Meats & Wool
		d. Dairy Products
		e. Poultry & Poultry Products
		f. Forest Products & Ornamental & Drug Plants
		g. Cross-Commodity & Functional Studies
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	a. Plant Pathology, Botany, & Diseases of Miscellaneous Crops
		b. Diseases of Field Crops
		c. Diseases of Fruit Crops
		d. Diseases of Vegetable Crops
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils	a. Soil Chemistry & Microbiology
		b. Soil Fertility, Management & Soil-Plant Relationships
		c. Soil Physical Properties, Conservation & Classification
22	Vegetables	a. Vegetable Crops
		b. Potatoes
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control